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ABSTRACT

A study to develop a technique for measuring the curiosity of young children and to determine whether three treatments affected the subjects as hypothesized is presented. The Appalachia Educational Laboratory's Preschool Education Program sought to stimulate curiosity in its 3-, 4-, and 5-year-old subjects. One third of the children received only a daily television program. Another third saw the television program and were visited in the homes each week by a paraprofessional. The remaining third saw the television program, received the weekly visit, and attended an hour and a half session in a mobile classroom when it visited their area once a week. Testing involved bringing the children to the field office for a videotaped session. After completing the testing, the children were sent to a room and play for a period of 15 minutes. The degree of curiosity was operationally defined as the proportion of the total time spent experimenting with the unfamiliar object. The device used to stimulate the children's curiosity was a brightly colored box. It was found that boys appeared more interested in the device than girls, based on their interaction with it. It is concluded that girls at this age have the ability to manipulate these objects but are no longer at a developmental stage in which they are as interested in such activities as boys. (Author/CK)

by

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Measuring Children's Curiosity

The Appalachia Educational Laboratory's Preschool Education Program sought to stimulate curiosity in its 3-, 4-, and 5-year-old subjects both directly and through their parents. The subjects were encouraged to become curious and flexible learners with the initiative to engage in learning tasks on their own.

The Laboratory's project included a daily television program in which the television "teacher" appeared as a friend who shared experiences with the viewer in an intimate manner, weekly home visits by a paraprofessional who brought and participated in using educational materials with parents and their children, and a weekly visit to a mobile classroom which provided opportunities for the development of social learning skills.

The mobile classroom teacher and the paraprofessionals made conscious, systematic efforts to stimulate curiosity in their subjects. These efforts included the following:

- Listening to the children and encouraging their parents to do the same.
- Asking questions about the statements of the children and elaborating on them.
- Using and encouraging parents to use only verbal praise and not material objects as rewards when children engage in either formal or informal learning activities.
- Encouraging children to become inquisitive about their environment (e.g., "What makes the clouds move?" or "Let's find out what made that tree die.").

- Responding to children in an enthusiastic manner consistently during learning activities.

- De-emphasizing the importance of being right while focusing interest on why a particular answer was given.

Purpose

The purpose of this study was to develop a technique for measuring the curiosity of young children and to determine whether the three treatments affected the subjects in those treatments as hypothesized. The study sought to answer the following question: Did children exposed to paraprofessionals and teachers who engaged them in discussions and activities designed to stimulate their curiosity exhibit more curiosity as measured by the technique developed?

Sample

A group of over 350 3-, 4-, and 5-year-old children were enrolled in the Preschool Education Program. One third received only the daily television program. Another third saw the television program and were visited in their homes each week by a paraprofessional. The remaining third saw the television programs, received the weekly visits by a paraprofessional, and attended an hour and a half session in a mobile classroom when it visited their area once a week.

A random sample with equal numbers from each treatment group was selected to participate in the social learning skills testing. This testing involved bringing children to the field office for a videotaped session. After completing the testing, the children were asked to participate in the procedure used to measure their curiosity.

Method

The child's mother was instructed to accompany the child into a room and remain there with him for 15 minutes. She was to tell the child that he could play with anything in the room he wished. From that point on, the parent remained seated quietly in a chair near the door. She was instructed not to prompt the child to play with anything in particular.

The room contained a device that was foreign to the experience of the children as well as several familiar objects including a toy truck, coloring books and crayons, blocks, and dolls. A partition with a one-way mirror secluded an observer who used an eight-category system to record each child's behavior. The degree of curiosity was operationally defined as the proportion of the total time spent experimenting with the unfamiliar object, so

two categories would have been sufficient. But because of the desire to gather additional information and to improve the measurement technique, eight categories of behavior were used, with the coder making a decision approximately every three seconds.

The first five categories applied to the unfamiliar device and indicated which of its parts were being manipulated. Category six indicated that the child was playing with familiar objects, while category seven indicated that the child was staying next to his mother. The last category was a catchall and was used to indicate that the child was not active. It also was used on the rare occasions when the observer was unable to make a decision using any of the other categories. These categories are defined in Table 22.1.

Observational Reliability

The three observers employed to record the behavior of the subjects in this study were experienced in the use of systematic observational systems of up to 27 mutually exclusive categories. By comparison, the eight-category system was simple to use and therefore observer reliability was not a concern and was not measured.

The Device

The device used to stimulate the children's curiosity in this experiment was a brightly colored box about four feet long, eighteen inches wide, and ten inches high. Three neon and argon flickering bulbs and two green incandescent bulbs were enclosed by clear plastic at one end and could be controlled by the knobs of five dimmer switches. On each of the long sides of the box was mounted a hand-cranked drill which, when cranked, caused a disk with black and white patterns to rotate. The operator would see different colors, depending on the speed and direction of rotation of the disc. Midway back on top of the box was an electronic metronome with a knob which controlled the frequency of the beat and another knob which controlled loudness. Behind the metronome was a large globe lamp which glowed with a brightness and duration corresponding to the loudness and duration of the sound reaching it. An inclined plane beside the lamp had a steel ball suspended near the top. Because of concealed magnets, the ball did not roll down but moved in figure eights when pushed gently.

Table 22.1

Curiosity Categories: An Observational System

Code No.	Category
Experimenting with the Device	
1	Manipulating any of the five dimmer switches which control three neon and argon bulbs and two incandescent bulbs
2	Turning cranks to rotate either of the two black and white disks
3	Manipulating the electronic metronome
4	Making noises to activate the sound sensitive lamp
5	Manipulating the ball on the ramp
Nonexperimenting Activities	
6	Playing with the blocks, crayons, dolls, toy truck, or coloring books
7	Staying with parent--usually for security reasons
8	Pondering what to do next or no activity; coder cannot make decision using the other categories

Analysis

Eighty-one subjects participated in the experiment, resulting in unequal N's in the cells of the 3x3x2 factorial design used in the analysis of the data. The variable of primary importance was the amount of curiosity demonstrated, which was operationally defined as the proportion of time spent experimenting with the unfamiliar device. This value was calculated by dividing the total of tallies in categories 1, 2, 3, 4, and 5 by the grand total and multiplying by 100 to get a percent. Table 22.2 presents the sample size and means for each cell on this variable.

Table 22.2

Percent of Time Spent with Novel Device and Sample Size by Age and Sex within Treatment Groups

Age	TV-HV-MC		TV-HV		TV Only	
	M	F	M	F	M	F
3	N=4 $\bar{x}$-62.00	N=5 $\bar{x}$=43.20	N=5 $\bar{x}$=31.40	N=4 $\bar{x}$= 6.75	N=4 $\bar{x}$=27.75	N=5 $\bar{x}$=23.00
4	N=5 $\bar{x}$=62.00	N=5 $\bar{x}$=34.80	N=6 $\bar{x}$=26.50	N=3 $\bar{x}$=29.67	N=6 $\bar{x}$=18.67	N=4 $\bar{x}$=10.00
5	N=5 $\bar{x}$=74.00	N=3 $\bar{x}$=19.33	N=3 $\bar{x}$=54.67	N=3 $\bar{x}$=26.33	N=6 $\bar{x}$=10.83	N=5 $\bar{x}$=13.80
	N=27 $\bar{x}$=51.00		N=24 $\bar{x}$=28.13		N=30 $\bar{x}$=17.07	

As shown in Figure 22.1, there were substantial differences in the amount of time spent with the novel device both by sex and treatment group.

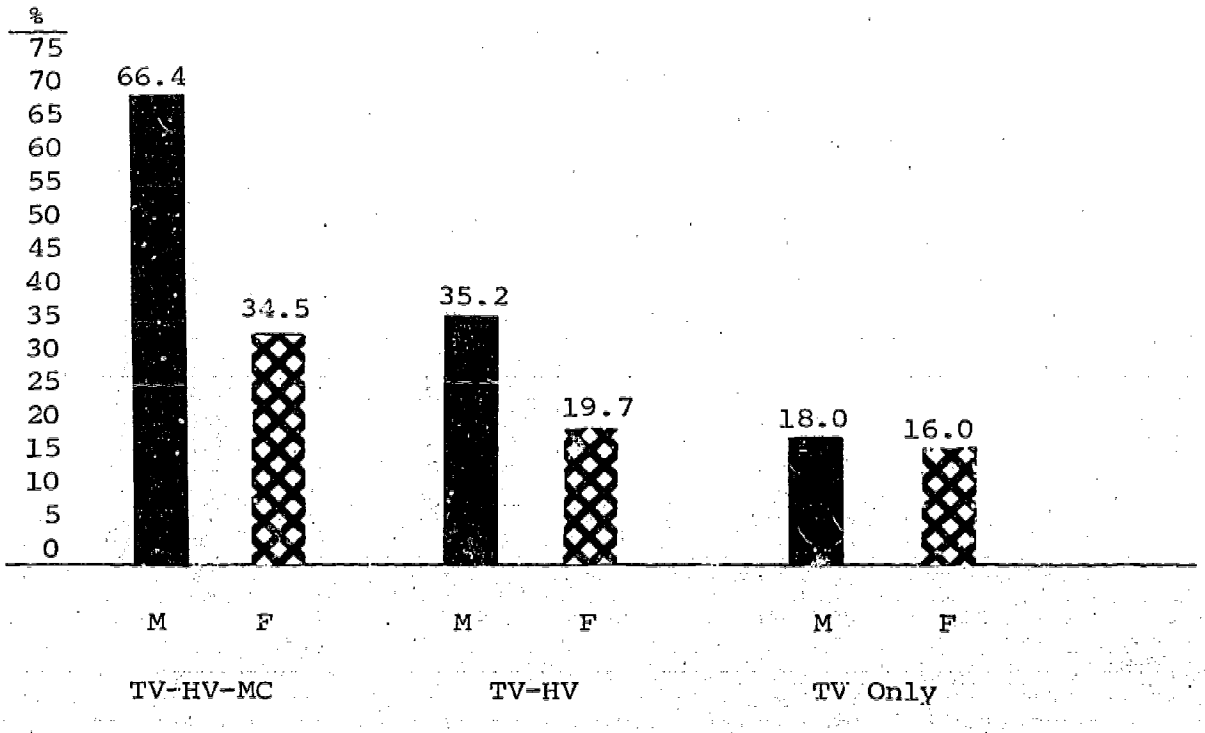

Figure 22.1

Percent of Time Spent with Novel Device by Each Sex within Treatment Groups

Table 22.3 presents the summary of analysis of variance of curiosity scores. Both treatment and sex produced significant main effects.

A Dunnett's post-hoc comparison indicates that the mean scores for curiosity were higher for the TV-HV-MC group than the other two treatment groups. Further, a significantly greater degree of curiosity was demonstrated by teh males than by females, and inspection of Figure 22.1 indicates that the males in both the package (TV-HV-MC) and the television-nome visitor (TV-HV) groups substantially outscored the females. Mean scores by sex are shown in that table.

Table 22.3

Analysis of Variance Table of Curiosity Scores

Source	η^2	d.f.	Mean Square	F	p
Trt.	0.075	2	7085.67	12.50	p<.001
Age	0.002	2	58.13	0.10	_____
Sex	0.111	1	6133.22	10.82	p<.001
Trt.-Age	0.048	4	665.87	1.17	_____
Trt.-Sex	0.056	2	1564.46	2.76	_____
Age-Sex	0.014	2	401.13	0.71	_____
Trt.-Age-Sex	0.039	4	549.17	0.97	_____
Error	0.650	63	566.86		

Discussion

Degree of curiosity has been defined in this study as the desire to explore and control one's environment for the intrinsic reward of satisfying curiosity of engaging in the activity. The technique devised to measure it discriminated well between groups of children who did and did not have experiences which were hypothesized to stimulate their curiosity and initiative. Participation in all three components of the Appalachia Preschool Education Program (television, home visitor, and mobile classroom) was associated with greater curiosity than participation in two components (television and home visitor); children who received only the television component had the lowest degree of curiosity.

It would appear that the boys were more interested in the device designed to measure curiosity based on their interaction with it. The girls' lack of interaction with the device could be attributed to several causes. First, girls may have less interest than boys in such a mechanical device. Second, as pointed out by Hutt in 1970, girls tend to be at a developmental level that is on the average one year ahead of boys. Hutt hypothesized that girls are involved in a verbal phase of development when boys still are principally involved with mechanical manipulation of objects in their environments. The latter premise seems tenable. As indicated in Technical Report No. 16, girls surpass boys in tasks involving dexterity and coordination as measured by the Frostig test. Therefore, one could conclude that girls at this age have the ability to manipulate these objects but are no longer at a developmental stage in which they are as interested in such activities as boys. If girls' lack of interest in manipulating objects is the result of acquiring a feminine role as defined by this culture, then the difference between girls in the TV-HV-MC group and girls in the other two groups may indicate a revitalization of this interest as a result of experiences on the mobile classroom.

However, the result of greatest interest here is not differences between sexes but rather those between treatment groups. As indicated earlier in this report, the treatment group which received the television program, home visitor, and the mobile classroom tended to show more curiosity as measured by the device utilized. Therefore, the program would appear to have been successful in this regard.

References

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